

CLAIMS

1. A toner concentration adjustment method for a liquid-development electrophotographic apparatus that uses liquid toner composed of carrier and toner particles dispersed in the carrier at a predetermined concentration, in which used liquid toner is collected from the liquid-development electrophotographic apparatus and is adjusted to its predetermined original concentration, and the thus-adjusted liquid toner is recycled, the method comprising:

introducing the collected liquid toner into a concentration adjustment pot, and replenishing the concentration adjustment pot with carrier and high-concentration toner which contains toner particles at a greater proportion than does the liquid toner used in the liquid-development electrophotographic apparatus;

separating and extracting the carrier from the liquid toner stored in the concentration adjustment pot so as to adjust the liquid toner concentration to a predetermined concentration; and

reusing the liquid toner, having been adjusted to the predetermined concentration, in the liquid-development electrophotographic apparatus.

2. A toner concentration adjustment method according to claim 1, wherein

the step of separating and extracting the carrier includes:

providing a first roller immersed in the liquid toner

stored in the concentration adjustment pot and driven to rotate; a second roller rotated on the first roller and receiving liquid toner from the first roller; a third roller for receiving a layer of the liquid toner from the second roller; and a bias voltage source for applying a bias voltage between the second and third rollers; and

applying the bias voltage so as to cause toner particles contained in the liquid toner to remain on the second roller, and cause the carrier to move to the third roller, the carrier having moved to the third roller being collected.

3. A toner concentration adjustment method according to claim 2, wherein the rotational speeds of the first, second, and third rollers rolling on one another are controlled in accordance with a detected toner concentration of the liquid toner stored in the concentration adjustment pot so as to adjust the quantity of the collected carrier.

4. A toner concentration adjustment method according to claim 1, wherein the carrier separated and extracted from the liquid toner stored in the concentration adjustment pot is introduced into the concentration adjustment pot as a replenishing carrier.

5. A toner concentration adjustment method according to claim 1, wherein the liquid toner collected after use includes liquid toner remaining on a surface of a photosensitive drum after transfer of a toner image to an intermediate transfer member, and liquid toner remaining on a

development roller after supply of liquid toner from the development roller to the photosensitive drum.

6. A toner concentration adjustment apparatus for a liquid-development electrophotographic apparatus that uses liquid toner composed of carrier and toner particles dispersed in the carrier at a predetermined concentration, in which used liquid toner is collected from the liquid-development electrophotographic apparatus and is adjusted to its predetermined original concentration, and the thus-adjusted liquid toner is recycled, the apparatus comprising:

a concentration adjustment pot into which collected liquid toner is introduced;

supply mechanisms for replenishing the concentration adjustment pot with carrier and high-concentration toner, respectively, the high-concentration toner containing toner particles at a greater proportion than does the liquid toner used in the liquid-development electrophotographic apparatus; and

a carrier extraction mechanism for separating and extracting the carrier from the liquid toner stored in the concentration adjustment pot, wherein

the liquid toner having been adjusted to the predetermined concentration in the concentration adjustment pot is reused in the liquid-development electrophotographic apparatus.

7. A toner concentration adjustment apparatus according to claim 6, wherein the carrier extraction mechanism includes

a first roller immersed in the liquid toner stored in the concentration adjustment pot and driven to rotate; a second roller rotated on the first roller and receiving liquid toner from the first roller; a third roller for receiving a layer of the liquid toner from the second roller; and a bias voltage source for applying a bias voltage between the second and third rollers, wherein

through application of the bias voltage, toner particles contained in the liquid toner are caused to remain on the second roller, and the carrier is caused to move to the third roller; and the carrier having moved to the third roller is collected.

8. A toner concentration adjustment apparatus according to claim 7, wherein the rotational speeds of the first, second, and third rollers rolling on one another are controlled so as to adjust the quantity of the collected carrier.

9. A toner concentration adjustment apparatus according to claim 6, further comprising a carrier pot for storing a carrier with which the concentration adjustment pot is replenished, wherein the carrier separated and extracted by means of the carrier extraction mechanism is introduced into the carrier pot.

10. A toner concentration adjustment apparatus according to claim 6, wherein the liquid toner collected after use includes liquid toner remaining on a surface of a photosensitive drum after transfer of a toner image to an

intermediate transfer member, and liquid toner remaining on a development roller after supply of liquid toner from the development roller to the photosensitive drum.

11. A toner concentration adjustment apparatus according to claim 6, further comprising a mechanism for detecting the concentration of the liquid toner stored in the concentration adjustment pot.

12. A toner concentration adjustment apparatus according to claim 11, wherein the mechanism for detecting the toner concentration includes a supply roller immersed in liquid toner stored in the concentration adjustment pot, and rotated at a predetermined speed; a reflection roller which rotates on the supply roller and receives liquid toner therefrom; and an optical sensor provided at a position facing the reflection roller.

13. A toner concentration adjustment apparatus according to claim 12, wherein the liquid toner which is stored in the concentration adjustment pot and which undergoes concentration adjustment is determined to have reached a near empty level when the toner concentration detected by means of the toner concentration detection mechanism has greatly dropped.

14. A toner concentration adjustment apparatus according to claim 12, wherein in accordance with the toner concentration detected by means of the toner concentration detection mechanism, replenishment with carrier or carrier extraction by means of the carrier extraction mechanism is

performed.